

INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1999	Park: Shenandoah NP
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Name: Dr. James McGraw Phone: 304-293-5201 Email: n/a	
Permit#: SHEN1999N-211	
Park-assigned Study Id. #: unknown	
Project Title: Censusing And Modeling A Population Of Eastern Hemlock (Tsuga canadensis) Using Remote Sensing (N-211)	
Permit Start Date: Jan 01, 2000	Permit Expiration Date Jan 01, 2000
Study Start Date: Jan 01, 1997	Study End Date Jan 01, 2000
Study Status: Completed	
Activity Type: Research	
Subject/Discipline: Ecology (Aquatic, Marine, Terrestrial)	
Objectives: 1. Distinguish hemlock trees from large scale, remotely sensed imagery based on the spectral reflectance properties of their canopy. ;2. Delineate and measure individual hemlock canopies from remotely sensed imagery using spatial pattern analysis methods. ;3. Using size/health - dependent recruitment, growth, and death rates as interpreted from the remotely sensed data, construct matrix population models for hemlock. Evaluate the effect of spatial and temporal variation on hemlock dynamics and identify critical life-history stages which have the greatest impact on population growth rate.;4. Compare and evaluate the accuracy and efficiency of air-based censusing efforts with more traditional ground - based censusing.	
Findings and Status: Aerial, large scale, color photographs of the research site (collected in the Spring of 1997,1998, and 1999) were scanned into a digital environment. The hemlock component within this high resolution (12.7 cm/pixel) imagery was spectrally segmented (maximum likelihood classification algorithm). Individual hemlock crowns were spatially segmented using a two part process: 1) a watershed segmentation algorithm was applied to a smoothed Euclidean Distance map of the hemlock component and 2) A rules-based automated procedure based on minimum crown size was developed to correct some of the oversegmentation produced by the watershed procedure. ;Individual crowns from 1997 and 1998 were rectified using a automated rules-based procedure. ;The hemlock population was divided into crown size classes and fates of individual crowns (mortality, reduction, growth, no change) determined . On-going work is incorporating this demographic data along with fertility into a series of matrix population models to assess overall population change, and the effects of density and environmental factors on population dynamics.	
For this study, were one or more specimens collected and removed from the park but not destroyed during analyses? No	
Funding provided this reporting year by NPS: 0	Funding provided this reporting year by other sources: 15
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	

Full name of college or university: n/a	Annual funding provided by NPS to university or college this reporting year: 0
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